Spot Safety Project Evaluation

Project Log # 200610097

Spot Safety Project # 05-01-210

Spot Safety Project Evaluation of the Traffic Signal Installation US 401 and SR 1503 (Donnybrook Rd)/SR 2779 (Old McCullers Rd) in Wake County

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

_____ 2/7/07
Samuel D. Coleman, EI Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 05-01-210 – Traffic Signal Installation US 401 and SR 1503 (Donnybrook Rd)/SR 2779 (Old McCullers Rd) in Wake County.

Project Information and Background from the Project File Folder

US 401 is a 5 lane divided roadway with a left turn lane, thru lane, and a thru-right turn lane at the treatment intersection. SR 1503 and SR 2779 are both two lane facilities. SR 1503 has a speed limit of 45 mph and SR 2779 has no posted speed. The intersection was controlled by a stop condition on SR 1503 and SR 2779.

The original problem statement was that the traffic volumes increased to where motorists cannot maneuver safely through the intersection. From 1/1/98 through 12/31/00 there were 31 total and 15 correctable (frontal type) crashes at the intersection. There were 3 left turn and 12 angle crashes resulting in 2 Class B and 8 Class C injuries. The improvement chosen for the subject location was to install a three phase, protected-permitted, traffic signal. The final completion date for the improvement at the subject location was on November 12, 2002 at a cost of $45,000.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes along the subject road, the crash data omitted from this analysis to consider for an adequate construction period was from October 2002 through December 2002. The before period consisted of reported crashes from January 1, 1999 through September 30, 2002 (3 years, 9 months) and the after period consisted of reported crashes from January 1, 2003 through September 30, 2006 (3 years, 9 months). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The treatment data consisted of all crashes within 150 feet of the subject intersection. The following data table depicts the Naive Before and After Analysis for the above information. Please note that Frontal Impact crash types were the target crashes for the applied countermeasure. These crash types considered are as follows: Left Turn, same roadway; Left Turn, different roadway; Right Turn, same roadway; Right Turn, different roadway; Head On and Angle.

Treatment Information

	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	50	31	-38.0
Total Severity Index	6.5	6.8	3.7
Frontal Impact Crashes	37	8	-78.4
Frontal Severity Index	8.1	16.0	97.9
Volume	27900	34140	22.4

Treatment Injury Crashes

	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	0	0	N/A
Class A	2	1	-50.0
Class B	3	2	-33.3
Class C	14	12	-14.3
Property Damage Only	31	16	-48.4

Frontal Injury Crashes

	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	0	0	N/A
Class A	2	1	-50.0
Class B	2	1	-50.0
Class C	13	5	-61.5
Property Damage Only	20	1	-95.0

Table 1.

The naive before and after analysis at the treatment location resulted in a 38 percent decrease in Total Crashes, a 78 percent decrease in Frontal Impact Crashes, and a 22 percent increase in Average Daily Traffic (ADT). The before period ADT year was 2001 and the after period ADT year was 2005.

Results and Discussion

The naïve before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 38 percent decrease in Total Crashes and a 78 percent decrease in Frontal Impact Crashes. The summary results above demonstrate that the treatment location appears to have had a decrease in the number of Total Crashes and a decrease in the number of Frontal Impact Crashes from the before to the after period.

Although the number of crashes decreased there was an increase in severity for the frontal impact crashes at the treatment intersection. The crash reports show that seven of the eight frontal impact crashes in the after period were the result of a vehicle running a red light. The other frontal impact crash was from a vehicle not yielding when making a right turn. During the site investigation there was adequate sight distance and time to make a sound decision before reaching the traffic signal during the yellow phase. There were no other issues noted during the field investigation.

As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of road.

Location Map: US 401 and SR 1503 (Donnybrook Rd)/SR 2779 (Old McCullers Rd)

Treatment Site Photos taken January 22, 2007

Driving west on SR 2779

Driving west on SR 2779

Driving east on SR 1503

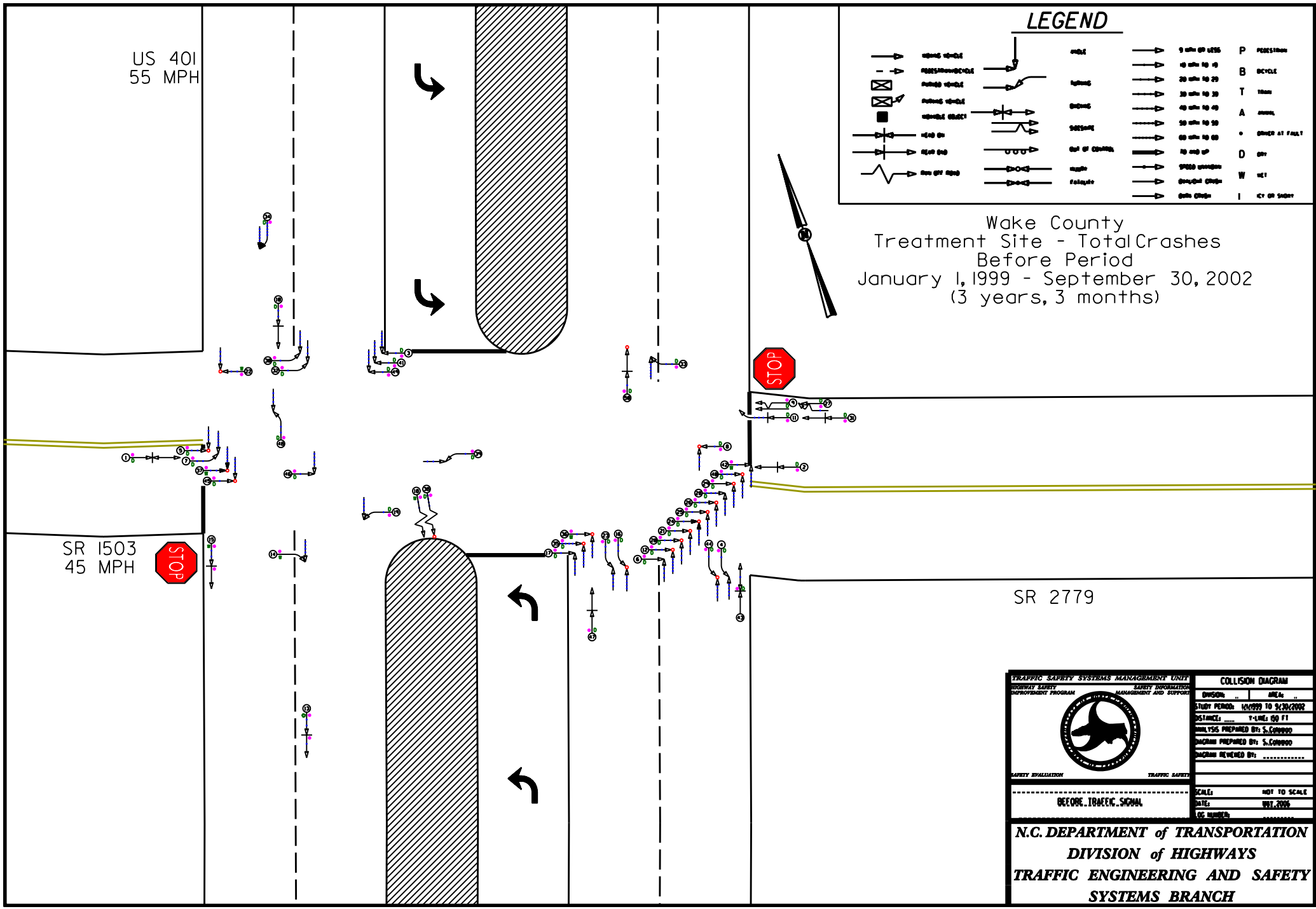
Driving east on SR 1503

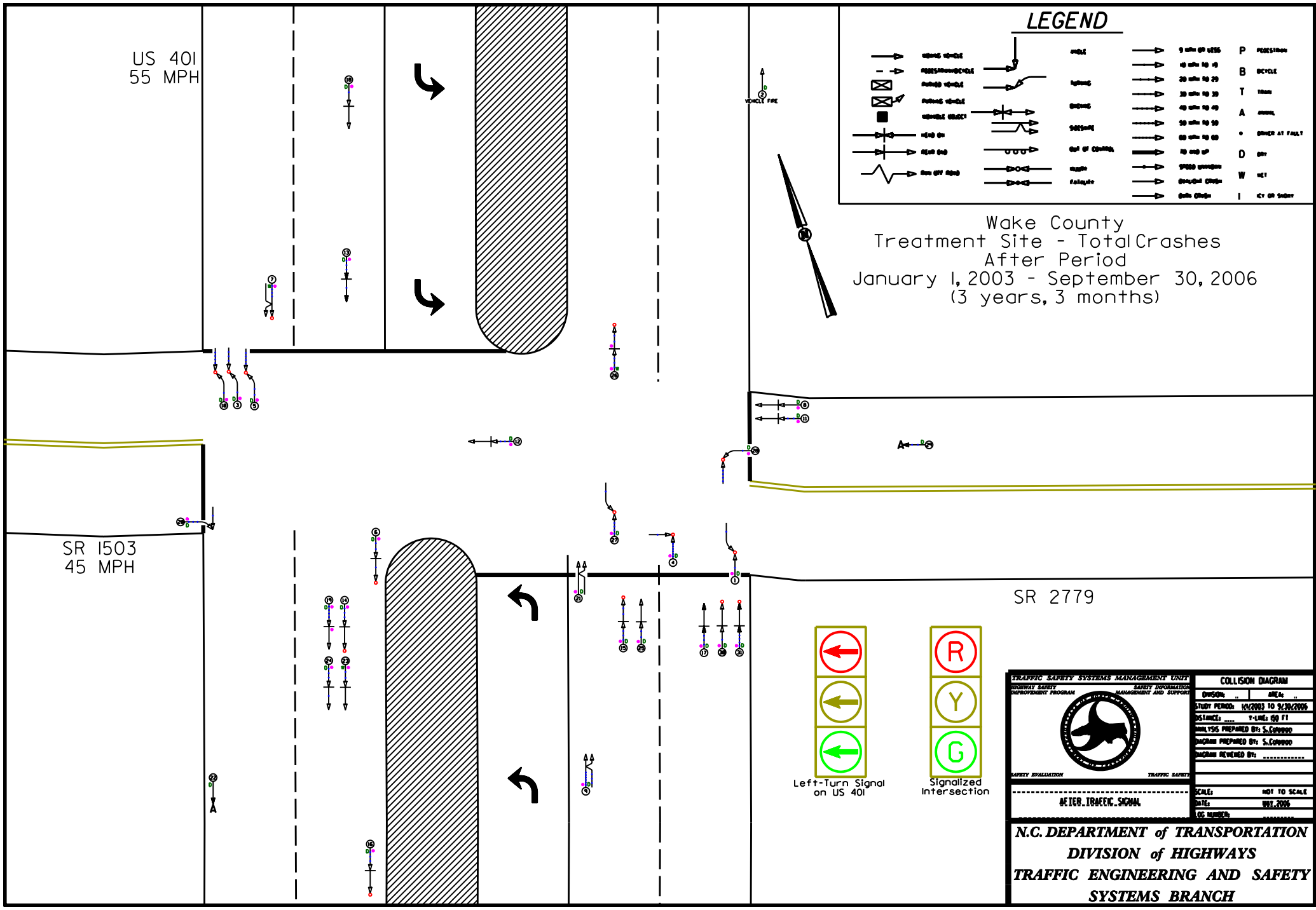
Driving north on US 401

Driving north on US 401

Driving south on US 401

Driving south on US 401


US 401
55 MPH
SR 1503
45 MPH
STOP
STOP
SR 2779
LEGEND
Wake County
Treatment Site - Total Crashes
Before Period
January 1, 1999 - September 30, 2002
(3 years, 3 months)
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT
HIGHWAY SAFETY IMPROVEMENT PROGRAM
SAFETY INFORMATION MANAGEMENT AND SUPPORT
SAFETY EVALUATION
TRAFFIC SAFETY
COLLISION DIAGRAM
DIVISION:
AREA:
STUDY PERIOD: 1/1/1999 TO 9/30/2002
DISTANCE: ..... Y-LINE: 150 FT
ANALYSIS PREPARED BY: S.Calloway
DIAGRAM PREPARED BY: S.Calloway
DIAGRAM REVIEWED BY:
BEFORE TRAFFIC SIGNAL
SCALE: NOT TO SCALE
DATE: MAY 2005
FILE NUMBER:
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH


US 401
55 MPH
SR 1503
45 MPH
SR 2779
LEGEND
Wake County
Treatment Site - Total Crashes
After Period
January 1, 2003 - September 30, 2006
(3 years, 3 months)
Left-Turn Signal
on US 401
Signalized
Intersection
R
Y
G
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT
HIGHWAY SAFETY IMPROVEMENT PROGRAM
SAFETY INFORMATION MANAGEMENT AND SUPPORT
SAFETY EVALUATION
TRAFFIC SAFETY
COLLISION DIAGRAM
AFTER_TRAFFIC_SIGNAL
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH